

Claims

1. Direct methanol fuel cell apparatus comprising:

5 a fuel container;

an anode adjacent the fuel container;

a proton exchange membrane adjacent the anode;

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a cathode adjacent the proton exchange membrane;

an oxygen supply adjacent the cathode;

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the fuel container containing methanol in water at a first concentration;

a cartridge selectively communicatively coupled with the fuel container;

the cartridge containing fluid comprising methanol in water at a second concentration, the

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second concentration higher than the first concentration.

2. The apparatus of claim 1 wherein the second concentration is at least double the first concentration.

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3. The apparatus of claim 2 wherein the second concentration is at least triple the first concentration.

4. The apparatus of claim 1 wherein the selective communicative coupling comprises a pushing pin actuatable by a human user, said pin puncturing the cartridge.

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5. The apparatus of claim 1 wherein the selective communicative coupling comprises a pump

actuable by electronic means, said pump pumping fluid from the cartridge to the container.

6. A method for use with a direct methanol fuel cell, the method comprising the steps of:

5        bringing a first solution of methanol in water at a first concentration into contact with an anode, the first solution contained within a container;

bringing oxygen into contact with a cathode, the cathode adjacent a proton exchange membrane and the proton exchange membrane adjacent the anode;

10        at a later time, bringing a cartridge into communicative coupling with the container, the cartridge containing a second solution of methanol in water at a second concentration, the second concentration higher than the first concentration.

15        7. The method of claim 6 wherein the second concentration is at least double the first concentration.

8. The method of claim 7 wherein the second concentration is at least triple the first concentration.

20        9. The method of claim 6 wherein the step of bringing the cartridge into communicative coupling with the container comprises a human user pushing a pin, said pin puncturing the cartridge.

25        10. The method of claim 6 wherein the step of bringing the cartridge into communicative coupling with the container comprises actuating a pump, said pump pumping fluid from the cartridge to the container.

11. Direct methanol fuel cell apparatus comprising:

30        a fuel container;

an anode adjacent the fuel container;

a proton exchange membrane adjacent the anode;

5 a cathode adjacent the proton exchange membrane;

an oxygen supply adjacent the cathode;

the fuel container containing methanol in water; and

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a stirrer within the fuel container.

12. The apparatus of claim 11 further comprising electronics operating the stirrer at intervals as a function of measurements made regarding the fuel cell apparatus.

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13. A method for use with a direct methanol fuel cell, the method comprising the steps of:

bringing a solution of methanol in water into contact with an anode, the solution contained within a container;

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bringing oxygen into contact with a cathode, the cathode adjacent a proton exchange membrane and the proton exchange membrane adjacent the anode;

at a later time, stirring the solution.

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14. The method of claim 13 wherein the stirring occurs as a result of a human user moving the fuel cell while it is in use.

30 15. The method of claim 13 wherein the stirring occurs as a result of a stirring by a stirrer contained within the container.